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CHICAGO 16, ILLINOIS

GAS ABSTRACTS

VOLUME 9, NUMBER 4

APRIL, 1953

AFFILIATED WITH

ILLINOIS INSTITUTE OF TECHNOLOGY

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GAS ABSTRACTS is published and distributed monthly by the Institute of Gas Technology, Chicago 16, Illinois. The contents of selected papers and patents are reviewed impartially by the editorial staff and material of potential interest to the Gas Industry is presented. Subscription rates to non-members of the Institute: $18.00 per year to U.S. addresses; $22.00 foreign.—Printed in the U.S.A.

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1. GAS INDUSTRY

Coast Gas

Moulton, J. S. COAST GAS HAS BRIGHT FUTURE. *Am. Gas Assoc. Monthly*, **35**, 4 (1953) February.

During and since World War II the Gold Rush migration to the West has been repeated on a vastly larger scale, and the population of Arizona, California, Nevada, Oregon, Utah and Washington now exceeds 16 million. The rapid population increase presents the Gas Industry with an almost superhuman task in meeting the West's expanding requirements, and justifies continued exploratory drilling, and investment in and expansion of transmission and distribution facilities. A. E. Neumann

Fuel Competition

Phillips, W. G. MEETING THE CHALLENGE OF OTHER FUELS. *Gas World* (British) **137**, 188-193, January 17; 252-256 (1953) January 24.

Much pertinent information on the competitive position of gas is collected in this discussion of the Ridley report on National Fuel Policy, and of other recent British and American data. The high cost of converting scarce coal into highly refined (electric) fuel, for sale as off-peak electric load, raises a challenge in considering the best use of the nation's fuels. Gas cooking is as popular as ever (65 to 75% of domestic gas), and better promotion and improved design of appliances will maintain this position against the promotion of the electric industry. The high saturation of gas cooking appliances in large American cities is cited. Solid-fuel cooking in Britain has been revitalized by newly designed appliances. Research is needed to develop the gas water-heating load in the new British housing, and to offset the portable electric space-heater competition. The increased production of coke from gas plants (3 million tons) has replaced coal chiefly in industrial and commercial heating. Current development work in these and in domestic heating is discussed, and its continuation is urged, to offset the new challenge of the expanding fuel-oil industry. O. P. Brysch

Richmond, K. C. HEATING AND FUEL MARKETS: HOW THE U.S. IS HEATED. *Coal Heat*, **64**, 36-37 (1953) January.

Salient features of the Census of Housing of 1950 are reviewed. Some 48 million dwelling units exist today, of which there are estimated to be 11 million heated by gas, 10 to 12 million by oil, 4 million by wood, 0.5 million by electricity, 0.8 million unheated, and 3.26 million vacant, which leaves 18 to 20 million heated by coal. O. P. Brysch

Texas Commission Rules

Carlson, R. F. TEXAS RAILROAD COMMISSION: ITS RULES, REGULATIONS. 4. REFINERIES AND NATURAL-GASOLINE PLANTS. *Oil Gas J.*, **51**, 121 (1953) February 9.

As in the case of drilling, producing, gas allowables and pipe line movements, the Texas gasoline plants and refineries are also required to submit detailed accounts of operations. After obtaining a gathering permit, and an initial plant operating permit (based on oil-to-gas ratio and sweet-sour gas volumes, filed in Form 7) the plant must obtain permits based on Forms 2-407 (gas mixing); SW-3 and SW-4 (sales tenders); GP-1-A, GP-2, GP-3, 1-407, 3-266-A and EH-4 (products); EH-3, SW-6 and ESA (operation transfers). Annual compliance certificates must be filed on the orders of O/G Docket Nos. 108, 120, 123-126, 128, 129, 132 and 146. O. P. Brysch

Carlson, R. F. TEXAS RAILROAD COMMISSION RULES, REGULATIONS: 5. PLANTS-PRESSURE MAINTENANCE, CYCLING, RECLAIMING, CARBON BLACK. *Oil Gas J.*, **51**, 120 (1953) February 16.

Besides earlier-mentioned reports, forms and permits required by the Texas Railroad Commission (see also Gas Abs. **9**, 18, February; **50**, 51 (1953) March) others are needed to show that no wastage of resources is going on. Form RP-1 covers reclaimed oil, and also any liquids and gases recovered during pressure maintenance and recycling. Accurate metering and avoidance of gas venting are demanded. Form PM-1 pertains to wells not recovering liquids. Carbon-black plants must make 5 lb/M from sweet gas and 1 lb/M from sour gas, first removing all condensables. O. P. Brysch

2. APPLIANCES

Appliance Sales

Donnelly, J. F. GAS APPLIANCE INDUSTRY SEES INCREASE IN SALES FOR THE COMING YEAR. *Gas Age*, **111**, 31-33 (1953) January 15.

An aggressive promotional program coupled with some relaxation of material problems raised the last half of 1952 above 1951 on sales of most gas appliances. It is expected that this trend will continue into 1952.

E. F. Searight

Burners

Shepherd, D. and Welch, H. J. (assigned to Allis-Chalmers Manufacturing Co.) GAS BURNER FORMED BY STACKED ANNULAR MEMBERS. U. S. 2,625,994 (1953) January 20.

A burner composed of stacked annular rings is described. E. F. Searight

Clothes Dryers

Stiglitz, E. WHAT CLOTHES DRYERS OFFER IN NEW SALES — IN NEW VOLUME. *Butane-Propane News*, **15**, 67, 68 (1953) February.

The advantages of automatic clothes dryers are pointed out, together with a number of good promotional methods for selling dryers.

E. F. Searight

Ignition

Lamar, C. C. (assigned to Harper-Wyman Co.) GAS BURNER FLASH TUBE IGNITION APPARATUS. U. S. 2,625,993 (1953) January 20.

An improved flash-tube ignition apparatus with curved flash-tubes is described. E. F. Searight

Range

Galloway, G. O. (assigned to Servel, Inc.) GAS RANGE. U. S. 2,625,149 (1953) January 13.

A gas range with the oven insulated in such a manner as to pass all air for combustion through the insulation is described. The insulation thus acts as a filter. E. F. Searight

3. COMBUSTION AND INDUSTRIAL FURNACES

Annealing

Turner, C. A., Jr. STRIP ANNEALING IS HIGH-SPEED CONTINUOUS. *Am. Gas J.*, **178**, 16-19 (1953) January.

Continuous strip annealing is found to give a much better product than slower pack annealing. The yield strength, tensile strength, and hardness are improved. In addition, the process involves many savings in materials handling. E. F. Searight

Chimney Dusts

Cleeves, J. C. THE GENERAL ASPECTS OF GRIT AND DUST COLLECTION FROM INDUSTRIAL CHIMNEYS. *J. Inst. Fuel* **25**, 323-326, 332 (1953) January.

Dust size, size range, and collector efficiencies are reviewed and commercial types of collectors are described. These include settling chambers, impingement collectors, electrostatic precipitators, and centrifugal collectors. Importance of the efficiency, initial cost, operating costs and maintenance are emphasized.

O. P. Brysch

Coal-Fired Turbine

Browne, K. A., Yellott, J. I. and Broadley, P. R. GAS-TURBINE PROGRESS REPORT — RAILROAD. *Trans. Am. Soc. Mech. Eng.*, **75**, 161-168 (1953) February.

This is a report on gas-turbine development for locomotive use. Test and operational locomotive units built in the United States and in Europe are discussed. Common features of all the units are an open cycle, and axial-flow turbines and compressors. The units use a heavy oil for fuel with a few units designed for burning pulverized coal. In England a 1600 hp. coal-burning gas turbine is being tested while in this country the Locomotive Development Committee has been testing a 4250 hp Allis-Chalmers pulverized-coal burning unit. The first commercially built gas-turbine locomotive in the United States was delivered in January, 1952.

E. J. Pyrcioch

Warren, T. E., Hudson, H. P., Robertson, J. D., and Mulligan, J. C. COMPARATIVE PERFORMANCE OF COALS OF DIFFERENT RANK IN A FILM-COOLED GAS-TURBINE COMBUSTER. *Trans. Am. Soc. Mech. Eng.*, 75, 35-42 (1953) January.

This paper reports tests conducted by the Fuels Division of the Mines Branch of the Department of Mines and Technical Surveys at Ottawa, Ontario on 23 coals of various groups within the bituminous class of the ASTM classification by rank. The coal combustor used was of the film-cooled type similar to one developed for locomotive use by Battelle Memorial Institute. For all tests the pulverized coal was of a size distribution such that 90% passed a 200-mesh sieve. Test results indicated a trend toward higher efficiences with higher volatile contents and with higher volatile heat contents. The present tests indicate that bituminous coals of the high-volatile A, B, and C groups will give satisfactory performance for this combustor. Coals of higher rank appear unsuitable because of low combustion efficiency. E. J. Pyrcioch

Yellott, J. I. (assigned to Bituminous Coal Research, Inc.) COAL PULVERIZATION AND COMBUSTION APPARATUS FOR GAS TURBINE POWER PLANTS. U. S. 2,625,791 (1953) January 20.

This invention relates to a pulverized coal pressure-combustor for use with gas turbine power plants and particularly adapted for locomotive use. Coal is pulverized by means of a flash pulverization nozzle. A heat release in excess of 1,500,000 Btu/hr/cu.ft. is claimed for the unit. E. J. Pyrcioch

Steam-Power Supply

Clark, L. J. STEAM AND POWER IN THE GAS INDUSTRY. *Gas Times* (British) 74, 24, 29-32, 37 (1953) January 9.

The production and utilization of steam and power in the British gas industry is presented. Depending on local conditions and factors, the cost of providing steam and electrical power for gasworks represents 2½ to 10% of the total direct costs of the works. The consumption of fuel can be substantially reduced by efficient waste-heat recovery in the carbonising and gasification processes. Recent developments of the industrial gas turbine indicate that the direct conversion of waste-heat into electrical energy is a possibility, with the amount of electricity that can be generated likely to be about twice that obtainable from the normal steam cycle. E. J. Pyrcioch

4. CARBONIZATION AND GASIFICATION

Carbonizing Plant

OLDEST BY-PRODUCT COKE OVENS CLOSED. *Gas World*, 137, 450 (1953) February 14.

The last battery (of four) in the first by-product coke oven plant to be built in England, at Bankfoot Coke Works, Crook, Durham, was closed recently. The oldest battery (1882) cost 226 Pounds/oven, and carbonized 4½ tons coal per oven in 60-70 hours. O. P. Brysch

Coal Cleaning

Hickey, J. H. (assigned to Great Lakes Carbon Corp.) METHOD OF PRODUCING A PURIFIED COKE. U.S. 2,624,698 (1953) January 6.

Coking coal fines (10-mesh) already cleaned by gravity methods, are freed of silicon impurities by adding 2 to 5 times their equivalent of volatile fluorides (HF, $(NH_4)_2F_2$, NH_4HF) and heating to between 100° C. and initial plastic temperature (400° C.) in a stainless steel reactor to volatilize the silicon fluorides. The coal may then be coked to form a pure material useful in electrode manufacture. O. P. Brysch

Gas Dilution

Veryard, J. T. CALORIFIC VALUE CONTROL. *Gas J.* (British, 273, 208, 213, 214 (1953) January 28.

The calorific value of a gas can be controlled by dilution with producer gas, blue water gas or carbureted water gas. Producer gas is used widely because of the simple plant installation and minimum operating attention. The production of blue water gas requires a more costly plant with a lesser degree of flexibility of output, and is thermally less efficient than producer gas production. Carbureted water gas has the

advantage over both producer gas and blue water gas in that the calorific value may be easily varied over a wide range. The dilution can be conducted with automatic controls. A few automatic control installations are described. E. J. Pyrcioch

Gas Fractionation

Bardin, J. S. and Beery, D. W. PRODUCING AMMONIA SYNTHESIS GAS. *Petroleum Refiner*, 32, 99-102 (1953) February.

This article reviews the application of low-temperature nitrogen washing as developed by the German Linde Company for hydrogen-rich gases for the production of ammonia synthesis gas, as well as pure hydrogen (98% or better). Approximate investment figures and utility requirements are given. Attention has been called to the possibility for the separate recovery of valuable gas components like methane, ethane, propane. I. P. Patel

Germanium from Coal

Thompson, A. P. and Musgrave, J. R. GERMANIUM, PRODUCED AS A BYPRODUCT, HAS BECOME OF PRIMARY IMPORTANCE. *J. Metals*, (AIME) 4, 1132-1137 (1952) November: *Mining Eng.*, 5, 42-44 (1953) January.

Development of uses for germanium in electronic devices (rectifiers, diodes, transistors, photoelectric units) during and since World War II, has led to increased production. In the U. S. 6000 lb. were recovered in 1951; in England, production from flue dusts (coal) began in 1950. A review of properties, recovery (with 4 flow sheets) and purification, with 30 references, is given. (See also Gas Abstracts 8, 228 (1952) December). O. P. Brysch

Hydrocarbon Gasification

Morgan, J. J. GASIFICATION OF HYDROCARBONS FOR PRODUCTION OF GASES TO SUPPLEMENT NATURAL GAS IN CITY SUPPLIES. Chap. X, LIQUEFIED PETROLEUM GASES. *Gas Age* 111, 26-32 (1953) January 29.

Early developments and descriptions of some propane-air and butane-air gas plants are discussed. D. C. Gami

HCN Synthesis

Norton, C. L., Jr. (assigned to The Babcock & Wilcox Co.) METHOD FOR PRODUCING HYDROGEN CYANIDE. U. S. 2,625,463 (1953) January 13.

The nitrogen component of preheated air is reacted with a vaporized hydrocarbon to form hydrogen cyanide, the oxygen of the air being used for combustion to supply heat for the process. C. von Fredersdorff

H_2S Removal

Neal, E. J. LIQUID PURIFICATION. *Nat. Gas Bull.* (Australia), 16, 21-26 (1952) November-December.

Liquid processes for removal of hydrogen sulfide are reviewed with special attention to their application in plants of small capacity. D. M. Mason

H_2S Utilization

USING THE SULPHUR IN COKE-OVEN GAS. *Coke & Gas* (British), 15, 32-33 (1953) January.

The Bagley-Schütt "Intensive" process for the production of sulfuric acid from hydrogen sulfide is described. Combustion of hydrogen sulfide-air mixtures produces sulfur dioxide which is then converted to sulfur trioxide and sulfuric acid by treatment with nitroso-sulfuric acid in a packed tower. After absorption of the sulfur oxides by sulfuric acid in additional towers, nitric oxide is swept from the solution by hot gases, and sulfuric acid of 60° Beaume is recovered. Flexibility and economical operation are claimed for the process. C. E. Hummel

India Gas Line

Lahiri, A. A GAS GRID FOR THE DAMODAR VALLEY. *Fuel Research Inst. News* (India) 2, 1-8, 16 (1952) September.

The article, based on the author's report to the Indian government, outlines a project for conservation of coke-oven gas by a transmission system to Calcutta. Technical and economic aspects of the project are discussed. A 200-mile pipe line through the major coal fields of India, from the Sindri and Asansol works would pro-

vide 30 MMCF/day of coke oven gas for the fuel-using industrial areas of the valley and also the Calcutta metropolitan area. This would assure the most economical future supply when expansion was needed. O. P. Brysch

Oil Gas

Nicol, D.L., Guyer, J. J., Searight, E. F. and Linden, H. R. IMPROVEMENT OF OIL GAS SUBSTITUTABILITY FOR NATURAL GAS BY PRESSURE GASIFICATION. Institute of Gas Technology (Chicago) Interim Report (1953) February.

Oil gases were produced from typical gas-making oils at cracking unit pressures of one to four atmospheres absolute, to determine the effect of pressure gasification on oil gas composition and substitutability for high-methane natural gas. These gases were tested on seven critical burners after the true oil gas had been diluted with a synthetic blast blow-run gas (20% carbon dioxide—80% nitrogen) to a heating value and specific gravity that would maintain the rated heat input to the burners. The data for oil gases produced at atmospheric pressure are compared with the results of the preceding study of the substitutability of oil gases modified to a constant heating value. The results of the combustion tests are reported as the maximum percent oil gas in the oil gas-base gas mixture which maintained satisfactory burner performance. Gas compositions and substitutabilities are presented as functions of the true oil gas heating value at oil gasifications partial pressure levels of 0.75, 1.0, 2.1 and 2.9 atmospheres, to demonstrate the effectiveness of pressure gasification as a means of increasing oil gas substitutability over a range of true oil gas heating values of 900 to 1500 Btu/SCF. The effects of gasification pressure on the Btu recovery, make oil requirements, gas yields, tar yields and compositions and carbon formation for typical oils are also presented as functions of the true oil gas heating value at various pressure levels. These data serve to extend the published study of high-Btu oil gas production at atmospheric pressure, and provide the basis for an economic analysis of pressure gasification as a means of natural gas substitute production.

Authors' Abstract

Tar Emulsion Prevention

Linden, H. R. and Parker, R. PREVENTION AND RESOLUTION OF TAR EMULSIONS IN HIGH-BTU OIL GAS PRODUCTION. Institute of Gas Technology (Chicago) Interim Report (1953) January.

A preliminary study of the effects of wetting agents on the water contents of tars produced in high-Btu oil gas operation is presented. A stable tar emulsion is considered to be one from which only insignificant separation of water will occur during 16 hours of settling at room temperature. It is shown that there is a relationship between the water contents of stable emulsions of oil gas tars, and the interfacial tensions between such tar emulsions and the water. This relationship persists in tar emulsions produced from greatly different oils cracked over a wide range of conditions. Considerable reductions in the water contents of tar emulsions, and increases in settling rates at elevated temperatures, appeared to be attainable through the addition of suitable wetting agents to the circulating liquor in high-Btu oil gas plants. Such results are ascribed to reduction of the surface tension of the water, which in turn effects a reduction of the interfacial tension between the carrier water and the emulsion. It is also shown that those wetting agents which effect the greatest decreases in interfacial tensions of stable emulsions at ordinary temperatures, also cause the greatest increases in water-separating or tar-settling rates at elevated temperatures.

Authors' Abstract

Water Gas Equilibrium

Parts, A. G. THE WATER-GAS-SHIFT EQUILIBRIUM IN THE GASIFICATION OF LIGNITE WITH STEAM. *Australian J. Appl. Sci.*, 3, 257-61 (1952) September.

The gasification of lignite with steam yielded a product-gas analysis which is the result of the (1) carbon plus steam reaction to give carbon monoxide and hydrogen (2) the water-gas-shift reaction (3) and the methane formation reaction. Results indicate that the water-gas-shift reaction is already at equilibrium at a low temperature of 1000° K. S. Mori

Wood Distillation

Morgan, L. W., Armstrong, G. M., Jr. and Lewis, H. C. DISTILLATION OF HARDWOOD IN A FLUIDIZED BED. *Chem. Eng. Progress*, 49, 98 L-101 L (1953) February.

The results of a laboratory-scale, batch distillation of powdered red oak in a fluidized bed are discussed. Production of gas and liquid products correspond to results of commercial practice. W. G. Bair

X-rays of Coal

Mitra, G. B. X-RAY DIFFRACTION STUDY OF BITUMINOUS COAL. *Acta Crystallographica*, 6, 101, 102 (1953) January.

X-ray diffraction photographs of several samples of Indian vitrain show bands corresponding to spacings of 7.11, 4.45 and 3.6 Angstroms. The 3.6 band corresponds to the (002) line of graphite, but adequate explanation of the origin of the remaining two bands has not been found. D. V. Kniebes

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Belcher, R. DETERMINATION OF CHLORINE IN COALS. p. 70

Kelley, A. E. DOUBLE-DUTY GAS PLANT. p. 70

5. NATURAL GAS AND NATURAL GAS CONDENSATES

Carbon Black

Borger, I. W. (assigned to J. M. Huber Corporation) PROCESS AND APPARATUS FOR MAKING CARBON BLACK. U.S. 2,625,466 (1953) January 13.

It is claimed that, if the hydrocarbon is rapidly decomposed while in a highly diluted condition, very finely divided furnace carbon black in good yield can be produced. An apparatus to achieve this is described. D. C. Gami

Deep Wells

Adams, E. DEPTH — THE THIRD DIMENSION FRONTIER. *Petroleum Eng.*, 25, B9-B18 (1953) January.

During the past few years, a total of 70 wells have been drilled to depths below 15000 ft. A complete description of wells, classified according to states, is given in table form. D. C. Gami

Dehydration

Campbell, J. M. and Laurence, L. DEHYDRATION OF NATURAL GAS AND LIGHT HYDROCARBON LIQUIDS. PART IV. HOW LOW TEMPERATURE SEPARATION CAN DO THE TRICK. *Petroleum Refiner*, 32, 138-142 (1953) January.

The fourth of the series on dehydration deals with refrigeration without using hydrate inhibitor. Advantage is taken of the pressure differential between the well-head and the pipe line. The details of the process and charts for design are presented. The operating cost of low temperature equipment is estimated to be between $0.20 to $0.60 per MMCFd including the liquid handling equipment. I. P. Patel

District Supply

Körting, J. ZUR FRAGE DER WIRTSCHAFTLICHEN VERTEILUNGS-DRUECKE IN GASROHRNETZEN. (ON THE QUESTION OF ECONOMIC PRESSURE DISTRIBUTION IN GAS GRIDS) *Gas- und Wasserfach*, 94, 16-7 (1953) January 1.

Equations are developed for determining the optimum pressures for an ideal distribution system where compression costs are a factor. The relations between cost and yearly load, peak hourly load, allowable pressure drop and customer distribution are expressed mathematically, based on experience in European manufactured gas practise. R. F. Bukacek

THE DESIGN OF A MODERN GRID RECEPTION STATION. *Gas Times* (British) 74, 89, 90 (1953) January 23.

The factors considered in the design of a district governor station are discussed in application to a specific problem, and the sizing and selection of equipment are illustrated. R. F. Bukacek

HOW PHILADELPHIA ELECTRIC CO. USES AERIAL PHOT-MAP FOR PLANNING. *Gas Age*, 111, 11-13 (1953) January 29.

A solution to the problem of acquiring and main-

taining up to date maps for company planning and construction projects is described. Base drawings are made from aerial survey photographs and reproduced on plastic sheets for a permanent record. Reproductions can be made photographically at scales varying from 100 ft./in. to 3000 ft./in. R. F. Bukacek

Gas Condensate

Hoffmann, A. E., Crump, J. S. and Hocott, C. R. EQUILIBRIUM CONSTANTS FOR A GAS-CONDENSATE SYSTEM. *J. Petroleum Techn.* (A.I.M.E.), 5, 1-10 (1953) January.

Planning of the efficient operation of a gas-condensate reservoir requires a knowledge not only of the gross phase behavior of the system but also of the equilibrium distribution of the various components between the gas and condensate phases. This equilibrium distribution can be calculated with appropriate equilibrium constants. In this paper are presented equilibrium constants determined experimentally for the oil and gas phases initially present in the same reservoir and for the gas and condensate phases of the gas cap material at a series of pressures below the original reservoir pressure. Also presented is a method for the correlation of the experimentally determined equilibrium constants. The utility of the correlation is demonstrated further by an example of its use in adjusting the equilibrium data to permit their application to another gas-condensate system of similar composition. Authors' Abstract

Gas Holder

Fromson, H. A. GAS HOLDER. U.S. 2,626,859 (1953) January 27.

A flexible-bag type of holder is claimed, in which the bag is supported by a solid top plate and by horizontal articulated metal slats to maintain a narrow pressure range. The slats form flat panelled sides of a polygonal structure, and their ends slide in vertical channel grooves. As the bag is deflated, the lower slats being articulated, may be wound up on tensioned reels. O. P. Brysch

Gas Reserves

NATURAL GAS RESERVES. *Am. Gas J.*, 178, 27-30 (1953) February.

A brief treatment of the question of natural gas reserves, their importance and the means of their estimation is given. R. F. Bukacek

Gas Supply

Liberman, L. M. STRETCHING THE ST. LOUIS GAS SUPPLY. *Compressed Air*, 58, 34-39 (1953) February.

A brief description of the development of Laclede Gas Company of St. Louis, Mo., this article includes a discussion of their present supply problems and the propane-air plant designed to alleviate their difficulties. R. F. Bukacek

PIPE LINES NEEDED FOR PEAK-DAY GAS DEMAND. *Petroleum Eng.*, 25, D50; 1953) February; *Gas Age*, 111, 35-56 (1953) February 12.

A summary of the PAD report to the Secretary of the Interior, this article indicates that certain areas can expect continued governmental market control for the next few years. It is estimated that gas supplies probably will be adequate through 1955 in the overall picture, but the gas industry will have to lay almost 10 million tons of pipe by 1955 to keep up with the potential demand. R. F. Bukacek

LP-Gas Radio Service

McHenry, K. R. ARKANSAS DEALERS UNITE IN RADIO COMMUNICATIONS ASSOCIATION. *Butane-Propane News*, 15, 51-52 (1953) February.

Thirty-eight Arkansas LP-gas dealers have agreed to band together under one radio frequency for highway truck radio service.
R. A. Brown

LP-Gas Storage

50,000,000 GALLONS OF NEW STORAGE IN '53. *Butane-Propane News*, 15, 72-73 (1953) January.

A national survey by this periodical revealed that 40% of LP-gas bulk plants will expand their storage facilities in 1953. The biggest increases per plant will be in states east of the Mississippi River and the most popular storage addition will be the 30,000 gallon tank.
R. A. Brown

Pipeline Communications

Lester, C. B. MICROWAVES FOR PIPELINERS. PART III: PATHS AND SITES. *Pipe Line News*, **25**, 52-60 (1953) January.

In a continuation of previous publications on microwave systems, the subject of choice of paths and sites is discussed. Included are considerations in the design of a circuit, discussion of the size of the world, effect of hills and trees, comments on clearance, use of maps, and notes on surveying. Sample plotting charts are presented. R. A. Brown

Production Problems

Chisholm, f. and Green, B. Q. HOW TO TRAIN MUD ENGINEERS. PART II. *World Oil*, **136**, 125, 126, 128, 130, 132 (1953) February 1.

The purpose, apparatus and procedures, for testing drilling-mud in the field are outlined. This includes filtration, hydrogen-ion concentration, and sand content, for the mud; and alkalinity, lime content, chloride, and calcium, for the filtrate. B. E. Eakin

Henderson, J. H., Gove, N. B., Ledbetter, H. J. and Griffith, J. D. A LABORATORY INVESTIGATION OF OIL DISPLACEMENT FROM POROUS MEDIA BY A LIQUEFIED PETROLEUM GAS. *J. Petroleum Techn.* (Trans. AIME), **5**, 33-40 (1953) February.

The results of a series of laboratory flood tests using liquid iso-butane to displace refined oils from test cores are presented and interpreted on an empirical basis. The study revealed the similarity of the miscible liquid displacement to that of the immiscible-fluid displacement mechanism. The efficiency of the iso-butane flood decreased markedly as the oil viscosity increased, but the effect of injection rate on the effectiveness of the primary production stage was negligible over the range investigated. The presence of free-gas saturation prior to iso-butane breakthrough increased the volume of iso-butane required to recover a given percentage of the oil present. Injection of liquid iso-butane prior to water flood resulted in a marked improvement in oil recovery by the water flood.
Authors' Abstract

Production Review

Kornfeld, J. A. NATURAL-GAS PRODUCTION SHOULD RISE 8 PER CENT. *Oil Gas J.*, **51**, 207-209 (1953) January 26.

The 1952 production of 8 trillion cu.ft. of natural gas with a total revenue of 1.9 billion dollars is reviewed. The Gulf Coast, Mid-Continent, and Rocky Mountain areas are slated for expansion in 1953. Marketed production from 1940-1952 is tabulated. B. E. Eakin

Trench Filling Studies

Crandall, L. L. SOIL CHARACTERISTICS FOR TRENCH BACKFILLING. *Gas*, **29**, 31-34 (1953) February.

Soils are commonly classified as sand, silt or clays depending on particle diameter. These designations are a rough guide to the physical characteristics of the material. Of these, the shearing strength and compressibility of the soil are the most important. The moisture content of the material effects both strength and compressibility and is responsible for soil expansion. In trench backfilling these basic factors apply. In addition, the excavated material of low strength and high compressibility must be compacted to increase the density of the soil. Laboratory tests are made to determine the amount of compaction that can be obtained. The tests indicate an optimum moisture content at which maximum density is reached. The author believes that dumping dry backfill in a ditch is a waste of time and money, and predicts that within a few years all important backfilling will be done by compacting the soil in the trench. E. J. Pyrcioch

Underground Storage

Just, H. (UNDERGROUND STORAGE OF GAS IN THE U.S.A. AND POSSIBILITIES OF ITS APPLICATION IN EUROPE). DIE UNTERGRUNDSPEICHERUNGEN VON GAS IN U.S.A. UND DIE MOEGLICHKEITEN FUER DIE VERWENDUNG IN EUROPA) *Gas- und Wasserfach* (German) **94**, 2-7 (1953) January 1.

The general problem of storage of different forms of energy is discussed and the poor showing of gas and electricity (water) storage expressed in useful Kcal/m^3 is compared with

other heating fuels, when applied to the winter peak-load. American storage technology is reviewed. Comparative tables of American and German gas demands and storage capacities are presented. The geology and storage possibilities of Herscher Dome of Peoples Gas Light & Coke Co. of Chicago, and the Engelbostel Sattel of the Ruhrgas A-G and the Deutsche Vacuum Oil A-G are compared. A great expansion of the West European gas industry should result if underground storage near consuming centers is developed, and a gas pipeline from Iraq might then advance beyond the planning stage. O. P. Brysch

Kornfeld, J. A. MAJOR EXPANSION PLANNED FOR LARGEST GAS-STORAGE SYSTEM. *Oil Gas J.*, **51**, 122-123 (1953) February 9.

A brief description of Ohio Fuel Gas Co.'s expansion of its underground storage facilities is given. Already the worlds largest operator of underground natural gas storage, the current expansion will bring their storage capacity to 116 billion cu. ft. R. Bukacek

Oates, J. F., Jr. STRATEGIC UNDERGROUND GAS STORAGE PROMISES UNINTERRUPTED PEAK-PERIOD SERVICE IN CHICAGO. *Am. Gas J.*, **178**, 18, 19, 34, 35 (1953) February.

This report to an investments group by James F. Oates, Chairman of the Natural Gas Storage Co. of Illinois, on underground storage of gas is a brief discussion of the nature of the storage and peak-load situation. R. F. Bukacek

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Arabian Big-Inch

Finnie, R. LAYING THE MIDDLE EAST'S NEWEST BIG-INCH LINE. *Oil Gas J.*, **51**, 52, 53, 70, 71, 74 (1952) December 29.

A detailed sketch is given of the tremendous problems of logistics and procurement of supplies overcome by Arabian Bechtel Co. in laying a 26, 30, and 32-in., 555-mile, 300,000 bbl. per day crude-oil pipe line in the Middle East. I. P. Patel

Cracking Catalysts

Gladrow, E. M., Krebs, R. W., and Kimberlin, C. N., Jr. REACTIONS OF HYDROCARBONS OVER CRACKING CATALYSTS. *Ind. Eng. Chem.*, **45**, 142-147 (1953) January.

A variety of hydrocarbon feeds were cracked over various cracking catalysts and the results tabulated. A detailed analyses of the data is presented and the observed differences are explained by a hypothetical picture of the carbonium-ion complex. H. A. Dirksen

Fluidized Cracking

Krebs, R. W. (assigned to Standard Oil Development Co.) CATALYTIC DISTILLATION OF SHALE. U.S. 2,627,499 (1953) February 3.

The object is the improvement of fluidized oil shale and sand distillation processes with respect to fluid characteristics, gasoline yields and quality by admixing with the fluid mass a conventional cracking catalyst larger than the disintegrated oil-bearing mineral, the superficial gas velocity being controlled to preferentially entrain and carry out of the fluid mass the disintegrated material. H. A. Dirksen

Ringgenberg, H. I. (assigned to Sinclair Refining Co.) PYROLYTIC CONVERSION OF HYDROCARBONS WITH THE AID OF A FLUID CATALYST. U. S. 2,628,932 (1953) February 17.

An improved apparatus is claimed for stripping hydrocarbon vapors from the catalyst in the fluidized cracking process. J. M. Reid

Iron Catalyst Research

Podgurski, H. H. and Emmett, P. H. THE ADSORPTION OF HYDROGEN AND CARBON MONOXIDE ON IRON SURFACES. *J. Physical Chem.*, **57**, 159-164 (1953) February.

The adsorption characterisitics of various iron catalysts and iron samples for hydrogen and carbon monoxide have been evaluated from 10^{-2} to 700 mm. between -195 and 200°. No evidence could be found on bulk iron catalysts for the "solubility" effect noted by Beeck and coworkers for hydrogen in thin metal films of iron and nickel between -195° and 0.

Authors' Abstract

Oxo Motor Fuels

Morrell, C. E. (assigned to Standard Oil Development Co.) PRODUCTION OF COMPOUNDS FOR FUEL MIXTURES. U. S. 2,626,209 (1953) January 20.

A catalytic process for converting an aqueous mixture of oxygenated organic compounds to products suitable for incorporation into blends with hydrocarbons which can be used as fuels for internal combustion engines.

H. A. Dirksen

Pacific Coast Oil

Beach, F. K. CANADA LOOKS AHEAD. *Petroleum Eng.*, 25, A53, A56 (1953) February.

The author forsees a doubling in Canadian consumption of petroleum products by 1961. He suggests that Canada's western oil cannot compete for the markets in Halifax and Montreal, and is most likely to enter the Pacific Coast market area. R. F. Bukacek

Refinery Gas

Kelley, A. E. and Poll, H. F. DOUBLE-DUTY GAS PLANT. *Petroleum Proc.*, 8, 55-59 (1953) January; *Oil Gas J.*, 51, 161, 162, 165-168 (1953) February 23.

The Union Oil Co. of California has integrated the gas recovery facilities for the new 28,000 b/d fluid catalytic cracking unit with those of the existing 20,000 b/d *Thermofor* catalytic cracking unit. This additional capacity was due to an original over-design factor of 20%, operation at lower conversion levels and change from cracking and treating to treating only.

I. P. Patel

7. ANALYTICAL METHODS AND TESTS

Aromatics by Ultraviolet

Norris, M. S. and Coggeshall, N. D. ULTRAVIOLET ABSORPTION DETERMINATION OF C_9 and C_{10} AROMATICS. *Anal. Chem.* 25, 183-7 (1953) January.

The method applies to the analysis of different classes of C_9 ond C_{10}, aromatics boiling between 150-180° C. It is based on the close similarities in absorption characteristics of ortho-, meta-, and paramono-substituted aromatics as a class. Results check within less than 3% of amounts present in a known sample. When compared with the results of a chromatographic method, there is an average discrepancy of 4%.

R. Parker

Chlorine in Coal

Belcher, R. A WET-COMBUSTION METHOD FOR THE DETERMINATION OF CHLORINE IN COALS. *Analytica Chimica Acta*, 8, 16-21 (1953) January.

Chlorine in coals can be determined by wet-combustion with sulfuric acid in the presence of potassium dichromate and silver sulfate. The liberated chlorine is absorbed in hydrogen peroxide and after treatment with mercuric oxycyanide is determined acidimetrically. The method is simple, fairly rapid and should be suitable for multiplicate analysis. The results agree well with those given by two independent methods of analysis, i. e. incineration with Eschka mixture followed by the Volhard titration, and the high temperature combustion method. Author's Abstract

Micro Gas Analysis

Paneth, F. A. THE MICRO-ANALYSIS OF THE INERT GASES. *Endeavour* (British) 12, 5-17 (1953) January.

Modern methods of analysis of very small quantities of the inert gases are described. An account is given of such applications as the first isolation of a synthetic element — helium; the identification of the radioactive isotopes of xenon and krypton resulting from uranium fission; estimation of the age of iron meteorites; and determination of changes in the composition of the stratosphere. D. M. Mason

Spectrography

Key, C. W. and Hoggan, G. D. SPECTROGRAPHIC METHOD FOR ANALYSIS OF CRACKING CATALYSTS. *Anal. Chem.*, 24, 1921-1925 (1952) December.

A spectrographic method to provide determination of chromium, iron, nickel, sodium, and vanadium in silica-alumina cracking catalysts is described. Good reproducibility and sensitiv-

ity are obtained by the use of a lithium carbonate matrix, a rotating disk electrode, and a high-voltage spark discharge. G. L. Olson

Sulfate Determination

Toennies, G. and Bakay, B. PHOTONEPHELOMETRIC MICRODETERMINATION OF SULFATE AND ORGANIC SULFUR. *Anal. Chem.*, **25**, 160-5 (1953) January.

An analytical method has been developed which is characterized by the use of a glycol-ethyl alcohol-water system as a means of obtaining reproducible and stable suspensions of barium sulfate. The method permits determinations with a precision of ± 1% on samples containing 3 micrograms of sulfur. Its application to the microdetermination of sulfur in organic substances is described. Authors' Abstract

Thiophene Determination

French, K. H. COLORIMETRIC DETERMINATION OF THIOPHEN IN PURE BENZOLES BY THE ALLOXAN AND ISATIN REAGENTS. *J. Applied Chem.* (British) **2**, 664-666 (1952) November.

Owing to unexpected maxima in the color-concentration curves, some confusion may occur in the colorimetric test for thiophene using alloxan or isatin reagents if the test is applied to higher concentrations than those for which it was designed. A dilution procedure has been recommended to ensure that the color measurements are made on the portions of the curves before the maxima. Other precautions during the tests are also suggested.

Author's Abstract

Levitt, L. S. and Howard, E., Jr. DETERMINATION OF THIOPHENE BY OXIDATIVE DECOMPOSITION WITH NITRIC ACID. *Anal. Chem.*, **25**, 196-7 (1953) January.

Thiophene in petroleum products is determined by treating a sample with nitric acid, followed by precipitation and gravimetric determination of the sulfate formed. Prior to analysis, the sample must be freed of all sulfur compounds except organic sulfides. Applicability to colored and turbid samples and low probable error (less than 2%) are featured in this method.

C. E. Hummel

8. GENERAL AND PHYSICAL CHEMISTRY

Ammonia Synthesis

Barnes, K. B. BOOM IN AMMONIA. *Oil Gas J.*, **51**, 95-97 (1953) February 16.

Various corporations that are constructing plants to produce ammonia from natural gas are listed. A process chart for Spencer Chemical's plant showing major equipment, temperatures, and pressure is given. W. J. Pleticka

Burning Velocities

Cullen, R. E. A NONDIMENSIONAL CORRELATION OF FLAME PROPAGATION AT SUBATMOSPHERIC PRESSURES. *Trans. Am. Soc. Mech. Eng.*, **75**, 43-49 (1953) January.

The effect of ambient pressure on the propagation rate of Bunsen flames in propane-air and ethylene-air mixtures is described. It is concluded that the normal flame speed for the fuels studied varies inversely with the logarithm of the pressure from atmospheric pressures to as low as 1 in. Hg. abs. A nondimensional parameter, the Peclet number, is established that correlates the results with four burner sizes, two fuels, and for the range of pressures investigated. It is concluded that the Peclet number must be kept large to avoid considerable reductions in flame speeds at subatmospheric pressures. Author's Abstract

Walker, P. L., Jr. and Wright, C. C. PREDICTION OF HYDROCARBON BURNING VELOCITIES BY THE MODIFIED SEMENOV EQUATION. *J. Am. Chem. Soc.*, **75**, 750-753 (1953) February 5.

With more accurate activation energy data than the average values previously used, the modified Semenov equation for burning velocity is found to predict burning velocities of ethylene and acetylene quite well. E. F. Searight

Flame Temperatures

Smith, R. W. Jr., Edwards, H. E. and Brinkley, S. R., Jr. THE THERMODYNAMICS OF COMBUSTION GASES: TEMPERATURES OF METHANE-AIR AND PROPANE-AIR

FLAMES AT ATMOSPHERIC PRESSURE. U. S. Bur. of Mines Rept. of Invest. 4938 (1953) January.

The theoretical adiabatic flame temperatures of methane-air and propane-air flames at atmospheric pressure are presented as functions of the fuel-air ratio and the initial temperature of the gas mixture. P. P. Leo

Flow Through Pores

Wicke, E. and Vollmer, W. STROEMUNG VON GASEN DURCH FEINPORIGE STOFFE. (FLOW OF GASES THROUGH MICROPORES). *Chem. Eng. Science* (British) **1**, 282-92 (1952) December.

The flow of gases in the transition zone between laminar (Poiseuille) and molecular (Knudsen) flow, of great importance in vacuum technique, is finding increasing application in modern chemical industry. Moreover, there are special separation effects in this transition zone. Our knowledge of the flow through micropores, which often takes place even at atmospheric pressure in this transition zone is lacking. This investigation is concerned with the problem mentioned above. A short discussion is devoted to the transitory flow through single capillaries, while the flow minimum involved is qualitatively explained. The different behavior of the flow through micropores is attributed to the influence of the pore spectrum, and a new method of determining the "mean pore radius" is given. The effect of the mean gas pressure and of the temperature on this flow is examined, and the sometimes great influence of the slip along the walls and the dependence of the mean free path of the gas molecules on temperature is elaborated. Finally, the conditions are defined under which surface diffusion may come to play an important part in the direct flow through micropores. Authors' Abstract

Paraffin Properties

Person, W. B. and Pimentel, G. C. THERMODYNAMIC PROPERTIES AND THE CHARACTERISTIC CH_2 FREQUENCIES OF *n*-PARAFFINS. *J. Am. Chem. Soc.*, 75, 532-538 (1953) February 5.

A revision of the calculations of Pitzer on the thermodynamic properties of normal paraffins is presented. Reconsideration of the characteristic CH_2 frequencies has been made. Values of the parameters have been reviewed and, in some cases, revised. Results of the new calculations are compared with the available experimental data. Tables are given which present the calculations of the thermodynamic properties, $-(F^\circ - H8/T)$, $H^\circ - H8/T$, S° and C°_p, for normal paraffins from butane through heptane, and a table of increments is given which will permit the calculations of these thermodynamic properties of normal paraffins at least through *n*-eicosane. Authors' Abstract

Phase Behavior

Burriss, W. L., Hsu, N. T., Reamer, H. H. and Sage, B. H. PHASE BEHAVIOR OF THE HYDROGEN-PROPANE SYSTEM. *Ind. Eng. Chem.*, 45, 210-13 (1953) January.

The compositions of the coexisting liquid and gas phases of mixtures of hydrogen and propane more determined at temperatures between 40° F. and 190° F. throughout the two phase region. The data indicate that two phases exist at pressures above 8000 psia at 40° F.
O. T. Bloomer

Sulfur Properties

Bass, A. M. THE OPTICAL ABSORPTION OF SULFUR. *J. Chem. Physics*, 21, 80-82 (1953 January.

The optical absorption of sulfur has been studied in the vapor and liquid state and in solution. These measurements indicate the presence of S_8 ring molecules which disappear at high temperature. The absorption edge in the liquid shifts at the rate of 6.20A/°C toward longer wavelengths with increasing temperature. It is believed that this displacement is related to the thermal excitation of the vibration levels of the sulfur molecules.
Author's Abstract

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Hoffmann, A. E. EQUILIBRIUM CONSTANTS FOR A GAS-CONDENSATE SYSTEM. p. 67

Podgurski, H. H. ADSORPTION OF HYDROGEN AND CARBON MONOXIDE ON IRON SURFACES. p. 69

9. ORGANIC CHEMISTRY

Cresol Synthesis

Englund, S. W., Aries, R. S. and Othmer, D. F. SYNTHESIS OF CRESOL: SULFONATION OF TOLUENE. *Ind. Eng. Chem.*, **45**, 189-193 (1953) January.

This paper deals with sulfonation of toluene as a method of synthesizing cresol. The authors conclude that a chemical process can be developed but various factors can make the process uneconomical. W. J. Pleticka

L-T Tar Chemicals

Pound, G. S. PRODUCTION OF CHEMICALS FROM LOW-TEMPERATURE TAR. PART TWO. *Coke and Gas* (British), **14**, 401-407 (1952) November.

The first part of this article gave details of some of the plant used by Coalite and Chemical Products Ltd. at their Bolsover works for the production of a wide variety of chemicals from low-temperature tar. Those in particular were fuels and monohydric phenols. In this part the author describes the methods employed in the production of dihydric phenols and a number of miscellaneous products including pitch, creosote, various oils and solvents and a range of chlorinated compounds.

J. I. Wrozina

Petroleum Chemicals

Whalley, H. K. THE PETROLEUM-CHEMICALS INDUSTRY IN BRITAIN. PART I. *Coke & Gas* (British), **15**, 17-24 (1953) January.

A discussion and description of the development in Britain of the manufacture of chemicals from petroleum resulting largely from the new policy of home refining. H. A. Dirksen

PETROLEUM CHEMICALS AT WILTON. *Petroleum*, **16**, 19-21 (1953) January.

A petrochemical plant with a capacity for processing 250,000 tons of feed/year is now being operated by the Billington division of Imperial Chemical Industries, Ltd. at Wilton. The major chemical products of this plant are ethylene and propylene. A general description of the operation of the plant is given. W. J. Pleticka

10. CHEMICAL ENGINEERING

Cracking Reactor

Kollgaard, R. (assigned to Houdry Process Corp.) DISENGAGEMENT OF GASES FROM A MOVING BED OF FLUENT SOLID PARTICLES. U. S. 2,628,893 (1953) February 17.

An improved apparatus for disengaging gases from concurrent flow, moving solids bed systems in which high space-velocities are incurred. A system of inverted troughs placed in the lower portion of the reaction zone and sized to give gas velocities below that required to support the solid particles is used as a gas-solids separator. J. M. Reid

Cyclone Performance

Silverman, L. PERFORMANCE OF INERTIAL COLLECTORS. *Heating Ventilating*, **50**, 87-92 (1953) February.

Basic factors on the performance of cyclone type separators are presented. Equation for calculating the minimum size of particles that can be separated and for determining pressure loss through a cyclone are given. Tables listing performance characteristics for a number of collectors based on field tests and manufacturers ratings are included. E. J. Pyrcioch

Fluidized Heat Exchange

Barr, F. T., and Rex, W. A. (assigned to Standard Oil Development Co.) HEAT EXCHANGE OF FLUIDIZED SOLIDS WITH GASES AND VAPORS. U. S. 2,626,234 (1953) January 20.

An improved method and apparatus is claimed for distilling fluidized oil-shale employing the fresh shale feed to condense the liquid distillation products in a countercurrent heat exchanger. J. M. Reid

Gas Cleaning

Barr, R. L. (assigned to Westinghouse Electric Corp.) ELECTRICAL PRECIPITATOR. U. S. 2,626,008 (1953) January 20.

A portable type of collecting-electrode structure for an electrostatic gas cleaning apparatus is described. The charged particles of foreign

matter are collected on electrodes fabricated of lightweight flexible conducting sheets or fabrics. These sheets are maintained in parallel places by tension, and are supported on insulating rods to give uniformly spaced conducting surfaces. C. E. Hummel

Pebble Heater

Bearer, L. C. (assigned to Phillips Petroleum Co.) PEBBLE HEATER APPARATUS AND METHOD OF OPERATION. U. S. 2,626,287 (1953) January 20.

A fluidized reactor is claimed in which a pebble heater is used to transfer heat to the fluidized particles of the reaction zone. The reaction gases are quenched by a cooler bed of regenerated particles, and the coke-carrying particles provide fuel in a regenerator shell to reheat the pebbles. R. E. Peck

Piping Design

Braca, R. M. and Happel, J. ECONOMICS OF PIPE SIZING. *Heat Engineering*, 28, 8-15 (1953) January.

The article presents curves showing efficiencies of various pumps, motors and turbines. Steam and electric consumption are correlated against pump output. Cost of pump installation insulation and pipe are presented in graphical form. Economic velocities for sizing liquid lines are also presented. R. E. Peck

Production Costs

Wessel, H. E. HOW TO ESTIMATE COSTS IN A HURRY. *Chem. Eng.*, 60, 168-171, 200 (1953) January.

The author has grouped various costs of producing chemical products into fields of like products. Estimates of a new process can be made by taking representative figures from the proper grouping. Several tables and examples are given to show applications of this quick but sketchy method. W. G. Bair

Research in Grinding

Riley, R. V. SIZE REDUCTION. *Chem. Process Eng.* (British), 34, 8-12, 28 (1953) January.

This article reviews some of the aspects of size reduction based on information in recent British and a few American publications. The review covers the latest trends in grinding theory, operational principles and research. New material for use in size reduction machinery are described. The operation of a few of the newer type of crushers, disintegrators and pulverizers is discussed. E. J. Pyrcioch

Scrubber

Baird, R. C. (assigned to The Fluor Corp., Ltd.) GAS SCRUBBER. U. S. 2,625,383 (1953) January 13.

Improvement of gas scrubbers of the oil-bath type to reduce carry-over losses of oil during heavy throughput surges is described. Provision is made for progressively decreasing the surface area of the liquid as the pressure of gas increases. D. M. Mason

11. PROCESS EQUIPMENT AND INSTRUMENTATION

Cloud-Point Tester

Kanda, E. and Haseda, T. THE CLOUD POINT TEST FOR LOW-TEMPERATURE LUBRICATING OILS. *Eng. Digest*, (British), 13, 416-417 (1952) December.

Appparatus for cloud point observation by photo-electric measurement is described. Methods of assessing the number of types and amount of clouding impurities are described. D. M. Mason

Orifice Temperature Probe

Blackshear, P. L., Jr. NACA SONIC-FLOW-ORIFICE TEMPERATURE PROBE IN HIGH-GAS-TEMPERATURE MEASUREMENT. *Trans. Am. Soc. Mech. Eng.*, 74, 51-58 (1953) January.

A general discussion of the theory and application of the sonic-flow orifice for measuring hot gas temperatures. The general arrangement of two orifices in series is used. The upstream orifice is inserted in the hot gas stream. The gas is then cooled in a water-jacketed tube and drawn through a second orifice by a vacuum pump. The cool gas temperature, at the second orifice is measured by a thermocouple. From this temperature and the relationship between

the areas and pressures of the two orifices the hot gas temperature can be calculated. If care is used in the technique, results compare favorably with the sodium line reversal method and thermocouple measurements. W. G. Bair

Pipe Pressure Testing

Binckley, M. J. THE USE OF PIGS IN HYDROSTATIC TESTS OF LARGE DIAMETER PIPE LINES. *Gas Age*, **111**, 16-18, 50-56 (1953) January 29.

A test procedure has been developed that appears safe and efficient for hydrostatic testing of large diameter pipe lines. Pressure curves are included. B. E. Eakin

Punched-Card Computer

Buchanan, A. C., Jr. and Skinner, H. COMPUTING GAS VOLUMES FROM ORIFICE-METER CHARTS INTEGRATOR DATA USING A PUNCHED-CARD SYSTEM. *Oil & Gas J.*, **51**, 72, 73, 79, 80 (1953) February 2.

Magnolia Petroleum Company's use of a punched card system for computing gas volumes is described. The system handles the automatical computations and is of real utility only where large numbers of calculations are to be performed, as for example Magnolia's 14000 orifice-meter charts per month.

R. F. Bukacek

Specific Gravity

Kenward, J. R. and Lucas, T. A. ACCURATE DETERMINATION OF SPECIFIC GRAVITY OF TOWN GAS. *Gas World* (British) **87**, 451-453 (1953) February 14; *Gas J.* (British) **273**, 445-46, 448 (1953) February 25.

An accurate, rugged specific gravity balance of the indirect weighing type is described.

R. A. Brown

Thermometry

Alford, J. S. and Heising, C. R. FAST THERMOCOUPLES AS CONTROL-SYSTEM ELEMENTS SENSING EXHAUST-GAS TEMPERATURES IN AIRCRAFT GAS RUBINES. *Trans. Am. Soc. Mech. Eng.*, **74**, 7-14 (1953) January.

Applications of thermocouples to measurement of gas-turbine exhaust temperatures. Practical methods are developed to evaluate time response and axial conduction effects. It is shown that thermocouples make adequate sensing devices for these rapidly changing temperatures.

W. G. Bair

German, W. L. THERMOSCOPESAND THEIR APPLICATIONS. *Ceramics* (British), **4**, 438, 40-46 (1952) December.

Thermoscopes are ceramic temperature indicators and they may be classified into two general types. One type depends upon the shrinkage of the ceramic while the other depends upon the fusion of the ceramic material, and different makes falling into these two categories are described. S. Mori

Lieneweg, F. TEST PROCEDURES AND METHODS FOR ELIMINATING THE MEASURING ERRORS OF THERMOMETERS. *Eng. Digest* (British) **13**, 412, 414 (1952) December: **14**, 18-20 (1953) January.

The accuracy of the calibration of temperature indicators depends on the energy absorbing unit such as thermocouples, resistance wires, and upon the precision instruments to which they are connected. Means of standardizing all such equipment are described in detail. Likely errors which may result in wrong temperature readings are pointed out along with methods of eliminating such errors. Three types of thermometer discussed are the resistance, e.m.f. couple and the radiation pyrometers.

S. Mori

Quereau, J. F. and Teague, A. B. (assigned to Leeds and Northrup Co.) ASPIRATION PYROMETER. U. S. 2,627,182 (1953) February 3.

The invention covers an aspiration pyrometer adopted to measuring the temperature of hot rolls for paper or rubber mills. The main features include an insulating block surrounding the temperature sensing element, a copper-constantan thermocouple, and a vacuum pump for passing hot air at high velocity past the thermocouple. The couple has long leads and is arranged in a flat spiral. The heat loss by conduction of the leads is minimized by this arrangement. Good response is claimed.

W. G. Bair

12. MATERIALS OF CONSTRUCTION

Coatings

Sneddon, R. PIPE PROTECTION WITH UNBONDED COATINGS. *Petroleum Eng.*, 25, D12, D14, D16 (1953) February.

A process of protective pipe coating used by Southern California Gas Company is described. A distinctive feature is the use of two separate coats with no bond between them for defense against shear stresses and lateral shocks.

D. M. Mason

Corrosion-Testing

Bilhartz, H. L. and Greebwell, H. E. THE COUPON TECHNIQUE — A VALUABLE TOOL IN CORROSION TESTING. *Corrosion*, 9, 66-73 (1953) February.

Important details of technique in the use of coupons (small metal test-plates) are discussed as applied by one company to problems of corrosion in oil and gas production. Selection of coupon material, preparation, shipment, and handling of specimens, and methods of exposing under various conditions are discussed.

D. M. Mason

Molded Carbon

Kaufmann, W. FORMKOERPER AUS KOHLE UND KOHLEPRODUKTEN (MOLDED BODIES OF CARBON AND CARBON PRODUCTS.) *Brennstoff-Chemie* (German), 34, 6-11 (1953) January 21.

Special types of molded carbon bodies and their manufacture and uses in industry are described, with special reference to the use of coal or coal products as the raw materials. O. P. Brysch

Super Refractories

Warring, R. H. SUPER REFRACTORIES. *Ceramics* (British), 4, 472-6 (1952) December.

Desirable properties exhibited by super refractories such as silicon carbide, or alumina enables them to replace high temperature alloys, and refractory bricks in many industrial applications. Such properties as higher temperatures, greater resistance to both chemical and physical wear, poorer heat conductivity, and greater strength are described in the article.

S. Mori

Water Tank Corrosion

Newell, I. L. THE CORROSION OF DOMESTIC GALVANIZED HOT WATER STORAGE TANKS. *Corrosion*, 9, 46-51 (1953) February.

After a general discussion of factors which lead to zinc becoming cathodic to steel in hot-water tanks the author relates instances pointing to the presence of copper as being a principal agent in the rapid dissolution of zinc protective coatings exposed to heated water. The copper appears to deposit as small metallic particles on the surface of the zinc, forming galvanic cells which lead to rapid pitting. As little as 0.1ppm copper causes a definite increase in corrosion rate. Examples of six galvanized water tanks in use for periods from 431 to 667 days are given. The author concludes lower corrosion rates can be secured by using all-galvanized systems, by removing carbon dioxide, by removing copper from water or lowering operating temperature to prevent potential reversal. Discussion relates case histories tending to place blame for rapid corrosion in galvanized water heaters on copper piping. Author's Abstract

13. NEW BOOKS

Natural Gas Economics

Stockton, J. R., Henshaw, R. C., Graves, R. W. ECONOMICS OF NATURAL GAS IN TEXAS. Bur. of Business Research Monograph No. 15, Univ. of Texas, Austin (1952), xvi + 316 pp.

This book, a study of the many-sided story of the natural gas business, should find a considerable reading public throughout the utility gas industry. Although the emphasis is on Texas gas, the wealth of statistics and other information necessarily includes the rest of the country and the material of this book is of general interest. A considerable amount of technology is described in covering such diversified topics as petrochemicals, natural gas reserves, taxation, regulation and competition among fuels. One of the surprising facts about this book is its eminent readibility; the authors have not chosen to give dry and technically difficult reports, rather they have presented very detailed coverage of the many ramifications of the natural gas industry in a manner both palatable and informative. R. F. Bukacek

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Industrial Finishing
Industrial Gas (American)
Industrial Gas (British)
Industrial Heating
Institute of Fuel (British). Journal
Institute of Petroleum (British). Journal
Institute of Gas Technology Publications
Institution of Gas Engineers. Bulletins, Communications and Transactions
Instruments

Journal des Usines a Gaz
Journal of Applied Chemistry
Journal of Applied Mechanics
Journal of Applied Physics
Journal of Chemical Education
Journal of Chemical Physics
Journal of Engineering Education
Journal of Metals
Journal of Organic Chemistry
Journal of Petroleum Technology
Journal of Physical Chemistry
Journal of Research (National Bureau of Standards)
Journal of Scientific Instruments
Journal of Southern Research

LP-Gas

Materials and Methods
Mechanical Engineering
Mining Engineering

National Fire Protection Association Quarterly
National Gas Bulletin
National Petroleum News
Nucleonics

Official Gazette of the U.S. Patent Office
Oil and Gas Journal
Oil, Paint and Drug Reporter
Optical Society of America. Journal

Paint and Varnish Production
Petroleum
Petroleum Engineer
Petroleum Processing
Petroleum Refiner
Physical Review
Physics Today
Pipe Line News
Power
Power Engineering
Public Utilities Fortnightly

Review of Scientific Instruments
Revista dei Combustibili
Revue generale du Gaz

Science
Southern Gas Association Progress
Southern Power and Industry
Spectrochemica Acta

Technical News Bulletin

U.S. Bureau of Mines. Bulletins, Information Circulars, Reports of Investigations and Technical Papers

World Oil

THE GAS INDUSTRY'S OWN EDUCATIONAL AND RESEARCH FACILITY